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## MEMORANDUM



**To:** Steve Faryan  
**From:** Ron St. John  
**Date:** September 23, 2003  
**Subject:** AIR MONITORING PROGRAM AT LOCKFORMER

### **1.0 INTRODUCTION**

This memo has been prepared to provide an evaluation of the air monitoring program at the Lockformer facility through August 12, 2003. Based on this evaluation, revisions to the program are recommended to decrease costs without diminishing the ability of the air monitoring program to adequately monitor and document compliance with the applicable emission and air quality standards.

### **2.0 EXISTING AIR MONITORING PROGRAM DESIGN**

The remediation systems at Lockformer were activated on June 10, 2003 (SVE system) and June 27, 2003 (ERH system). Air emission standards for the remediation air stream were developed by the Illinois EPA and presented in Construction Permit ID No. 043055AAC. The construction permit is included as Attachment A. Annual ambient air screening standards were established by the USEPA and are summarized in Table 1.

The remediation system and associated air sampling program were developed using conservative assumptions to ensure compliance with the air quality standards, given the uncertainty of the rate of contaminant liberation from the subsurface by the ERH system. The resulting plan included an ambient air sampling and remediation system sampling schedule that was very aggressive. The aggressive program was developed to protect against overloading the air treatment system, with the subsequent possibility of exceeding ambient air quality standards. The primary assumptions that led to the possibility of a massive loading of the carbon treatment system were:

- The simultaneous heating of Areas 1 and 2 by the ERH system.

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- A rapid rate of subsurface temperature increase over the entire ERH remediation area. It was assumed that 50 °C would be reached within two weeks of ERH system startup, and 90 °C would be reached within four weeks of startup.

Modified application of the ERH technology resulted in a staggered approach to heating the ERH remediation area. The modified plan included the startup of Area 2, then the gradual incorporation of individual subsections of Area 1 and the Degreaser Area. The rate at which the additional subsections are being incorporated into the ERH application area is dictated by the limitations of the ERH system.

Subsurface temperature data collected in Area 2 since the ERH startup indicate the rate of subsurface temperature increase (reaching approximately 50 °C over the 42 days of ERH application) is significantly lower than the initial predictions of 50 °C over 14 days. Only a portion of Area 1 (sub areas 1F and 1G) is currently being heated, and the average temperature of the heated area, after 12 days, is only 27 °C. The remainder of Area 1 and the degreaser area is approximately 15 °C.

Given these changes in the application of the remedial technologies and the air treatment monitoring data evaluated to date, a massive loading of the carbon treatment system is unlikely.

### **3.0 ANALYSIS OF AIR MONITORING RESULTS**

#### **3.1 RESIDENTIAL AMBIENT AIR SAMPLING**

Residential ambient air samples (24-hour composite samples) have been collected daily since the ERH system startup. Table 2 shows the analytical results obtained from those samples versus the applicable standard. The table shows there were no detectable chlorinated organics in 25 samples. Only one sample taken on July 9, 2003 showed a detectable organic, which was 0.71 ppb of TCE (versus a standard of 500 ppb), as shown on Table 1.

#### **3.2 SITE PERIMETER AMBIENT AIR SAMPLING**

Site perimeter ambient air samples (8-hour composite samples) have been collected twice per week since the ERH system startup. Table 3 shows the analytical results obtained from those samples versus the applicable standard. The table shows there were no detectable chlorinated organics in five samples. Two samples showed detectable levels of TCE. However, the concentrations were 0.98 ppb and 0.60 ppb versus a standard of 875 ppb, as shown on Table 1.

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### 3.3 ERH REMEDIATION AREA PERIMETER MONITORING

ERH remediation area perimeter monitoring has been conducted three times per day during the week and at least once per day during the weekends since the ERH system startup. Table 4 shows the results of the air monitoring conducted at the perimeter of the ERH remediation area (using a photoionization detector). The table shows there were no detectable concentrations of organics in any of the monitoring results.

### 3.4 REMEDIATION SYSTEM AIR STREAM SAMPLING

The remediation system air system has been sampled twice per week at three locations since the startup of the SVE system. The samples are collected from the inlet to the first vapor phase granular activated carbon (GAC) unit (location VPGAC01), between the first and second vapor phase GAC units (location VPGAC02), and after the second and final vapor phase GAC unit (location VPGAC03). This sampling allows the evaluation of the performance of the vapor phase GAC units.

Table 5 summarizes the performance of the activated carbon units. The total reduction of TCE and cis-1,2-DCE has been greater than 99.97% during the last four sets of analyses.

### 4.0 DISPERSION MODELING

USEPA asked Lockformer to perform dispersion modeling, using the EPA-approved SCREEN3 model, to determine the effect of the remediation air treatment system emissions on ambient air concentrations near the Lockformer property. A brief report was submitted titled *Calculation of Allowable Emissions From the Remediation System Stack*. This report is included as Attachment B. The calculations demonstrate an emission rate of 8 lbs/hr of organics would result in a one-hour maximum concentration of 318 ug/m<sup>3</sup> (59 ppb) versus a standard of 1,250 ppb, assuming the emissions were TCE. The emission allowed by the Illinois EPA permit is 0.66 tons/month or 1.83 lbs/hr. The corresponding predicted one-hour maximum concentration, at an emission rate of 1.83 lbs/hour, is 13.5 ppb.

Based on the last four results shown on Table 5, the loading into the first vapor phase carbon unit of the air treatment system is approximately 1.5 ppm. The current flow rate is approximately 2,200 cfm. This concentration and flow rate results in a loading on the first carbon unit of approximately 0.066 pounds/hr, only 3.6% of the Illinois EPA standard for the final effluent. Modeling predicts the maximum one-hour ambient air concentration would be only 4.2 ppb near the property line. This is less than 0.5% of the standard provided by USEPA, even without the use of the air treatment system. The air treatment system (currently operating at a 99.9% removal efficiency rate) reduces the emissions even further.

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### 5.0 AIR MONITORING PROGRAM EVALUATION CONCLUSIONS

The changes in the application of the ERH technology and the subsequent slow rate of subsurface temperature change greatly reduce the possibility of a large slug of contaminant being rapidly liberated from the subsurface by the ERH system. The actual application of the ERH technology allows a much more gradual rate of subsurface contaminant liberation that can be monitored and managed in a manner that does not require such a conservative ambient air monitoring program. The existing method used to determine the appropriate time to replace the primary vapor phase GAC vessel (when the concentration of the VPGAC02 is 20% of VPGAC01) is excessively conservative. Although the level of conservatism may have been appropriate under the initial loading assumptions, the actual operation conditions and loading trends allow for a more efficient method of determining the carbon replacement that will maximize the use of the carbon adsorption units.

Residential ambient air samples, site perimeter ambient air samples, and dispersion modeling show that any emissions from the Lockformer remediation system to date would result in ambient air concentrations significantly less than 1% of the applicable standards. The existing monitoring program is very expensive, as shown on Table 6. Reductions in the sampling frequencies would allow a more efficient monitoring of the remediation system and ambient air quality, while still ensuring compliance with the applicable standards.

### 6.0 RECOMMENDED CHANGES TO THE AIR MONITORING PROGRAM

Based on the air monitoring program evaluation, the following changes to the program are recommended until future analytical results indicate a need to increase sampling frequency. Table 7 provides a summary of the proposed routine air monitoring program revisions. Special air monitoring consideration for situations where elevated concentrations (spikes) are detected in the influent to the treatment system are discussed in Section 6.1.

#### 6.1 GRANULAR ACTIVATED CARBON-VAPOR PHASE

Currently, the organic concentrations in the air stream are measured at three locations: the inlet to the first carbon unit, between the carbon units, and the exhaust from the final carbon unit. These measurements are made twice a week, using Summa canisters to obtain the samples. The sample results are evaluated to determine the performance of the air treatment system.

The OMMP Sampling and Analysis Plan calls for daily sampling of the effluent gases for 30 days, then weekly after the first month once the temperature reaches 50 °C. This amount of sampling at the exhaust stack is unnecessary for the reasons described above,

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and considering the remaining carbon available in the existing air treatment system. The staggered ERH application and rate of heating have resulted in the total loading on the first carbon unit of approximately 200 pounds, far less than the minimum expected capacity of the unit (1,200 pounds, based on 10% of the unit's weight).

We recommend weekly sampling of the influent (VPGAC01) and intermediate (VPGAC02) air streams of the air treatment system, using Tedlar bags. The effluent/stack discharge (VPGAC03) air stream will be sampled 3 times per week using a Tedlar bag and once per week by Summa canister. The Summa canisters would continue to be sent to Columbia Analytical, and the Tedlar bags would be submitted to First Environmental for analysis within 48 hours. The Tedlar bags will be analyzed using SW-846 method 8260B. The Tedlar bag samples will be used to verify the performance of the air treatment system (also continuously monitored by the total hydrocarbon analyzer) in a timely manner, and the higher sensitivity of the Columbia analyses would allow better quantitation of the results.

We further propose that the replacement of the first carbon unit be performed after the concentration of total organic constituents after the first carbon unit exceeds 40% of the influent concentration (as indicated by the VOC results via Tedlar bag analysis) or exceeds 20 ppm, whichever comes first. This criteria is protective of the ambient air standards provided by the USEPA, and is well below the discharges allowed by the Illinois EPA permit. An outlet from the last carbon unit of 10 ppm results in a predicted maximum one-hour ambient concentration of 28 ppb, versus a standard of 1,250 ppb.

The potential for elevated concentrations (spikes) being generated from the ERH system treatment process will be addressed through the following methodology applied to the monitoring system:

1. The primary logic control (PLC) alarm on the total hydrocarbon analyzer port on the influent air stream from the ERH/SVE system to the activated carbon will be set at 110 ppm to notify Clayton employees of an elevated concentration situation.
2. Clayton employees will remotely monitor the total hydrocarbon analyzer port on the influent air stream from the ERH/SVE system to the activated carbon twice a day to manually check for the occurrence of spikes from the system.
3. In the instance where the influent air stream from the ERH/SVE system indicates concentrations greater than 80 ppm, Tedlar bag samples will be collected from the influent, intermediate, and effluent/stack air streams of the treatment system on a daily basis. The Tedlar bag samples will be submitted to First Environmental for expedited VOC analysis. This sampling will continue until both the Tedlar bag analyses and the total hydrocarbon analyzer indicates that the peak concentrations being generated by the ERH/SVE system have dissipated.

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The 110 ppm action level set for the total hydrocarbon analyzer was developed by first considering that the typical minimum background concentration of methane exhibited by the analyzer to date as being 30 ppm. Conservative calculations were then performed to identify the maximum influent concentration if total breakthrough through the first 12,000 lbs. carbon vessel was assumed (catastrophic occurrence), and only treatment by the second 12,000 lbs. carbon vessel was available. It was further assumed that maximum amount of time that a catastrophic failure of the first carbon unit could go unidentified was ten-days (from the time of the previous sample acquisition until the time of the receipt of the next sampling events results). These calculations indicated that the second carbon would be capable of reducing an 80 ppm air stream to concentrations less than 50% of the lowest applicable discharge standard.

### **6.2 REMEDIATION AREA PERIMETER**

The remediation area perimeter is being sampled three times a day during the week, and one time per day on the weekend. The purpose of the sampling is to detect any leaks from the plenum. No value has been detected by the PID at any of the four monitoring points at any time. Therefore, we propose to continue remediation area perimeter sampling during weekdays only. Further, we propose to continue using the PID for screening purposes. If the PID ever shows a reading greater than 25 ppm, we propose to use the MIRAN instrument to determine whether the reading is due to TCE.

### **6.3 RESIDENTIAL MONITORING**

Residential monitoring is currently conducted daily. In accordance with the approved sampling schedule, residential monitoring will be conducted once per week after the ERH system has operated for 60 days. However, if a residential sample shows over 5% of the permitted concentration, we propose to re-instate daily sampling for a minimum of 30 days.

### **6.4 SITE PERIMETER MONITORING**

Based on the results presented in Table 3, we propose to continue the current site perimeter monitoring frequency (twice per week), regardless of subsurface temperature.

### **6.5 VACUUM PIEZOMETERS**

We propose to continue the program specified in the OMMP Sampling and Analysis Plan, which calls for weekly monitoring for pressure and VOC concentrations (via PID) when average subsurface soil temperatures are below 50 °C and daily monitoring when average subsurface soil temperatures are between 50 °C and 90 °C.

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**6.6 SVE EXTRACTION WELLS**

We propose to continue the program specified in the OMMP Sampling and Analysis Plan, which calls for weekly sampling of the wells using a PID.

**6.7 LIQUID PHASE GAC**

We propose to continue the program specified in the OMMP Sampling and Analysis Plan, which calls for monthly sampling of the influent, intermediate, and effluent samples.

**6.8 LOCKFORMER BUILDING INTERIOR**

We propose to continue to perform weekly sampling of the building interior using a PID. We further propose that, if the PID reading exceeds 25 ppm, we determine the concentration of TCE using the MIRAN instrument.

## TABLES

**TABLE 1**  
**Ambient Air Screening Standards**

The Lockformer Company / Lisle, Illinois

PARAMETER	Maximum Annual Exposure (ppb)	Corresponding Maximum 1-hour Exposure (ppb)	*Corresponding Maximum 8-hour Exposure (ppb)	*Corresponding Maximum 24-hour Exposure (ppb)
Trichloroethene	100	1,250	875	500
1,1-Dichloroethene	20	250	175	100
1,2-Dichloroethene (cis + trans)	200	2,500	1,750	1,000
Vinyl chloride	30	375	263	150
1,1,1-Trichloroethane	700	8,750	6,125	3,500
1,1-Dichloroethane	N/A	N/A	N/A	N/A
Tetrachloroethene	40	500	350	200

**NOTE:** \* 1-hour, 8-hour, and 24-hour exposure standards were calculated from the maximum annual exposure values using the multiplication factors presented in Section 4.2 of "Screening Procedures for Estimating the Air Quality Impact of Stationary Sources, Revised", U.S. EPA Office of Air and Radiation, October 1992, for the correlation of various averaging time standards (1-, 3-, 8-, 24-hour, and annual).

**TABLE 2**  
**Summary of Ambient Air Analytical Results**  
*Residential Sampling*

The Lockformer Company / Lisle, Illinois

SAMPLE DATE	SAMPLE LOCATION	COMPOUNDS						
		TCE	1,1-DCE	1,2-DCE (cis + trans)	VC	1,1,1-TCA	1,1-DCA	PCE
		Corresponding Maximum 24-Hour Exposure Standard						
		500 ppb	100 ppb	1,000 ppb	150 ppb	3,500 ppb	N/A	200 ppb
06/27/03	RSML01	ND	ND	ND	ND	ND	ND	ND
06/28/03	RSML01	ND	ND	ND	ND	ND	ND	ND
06/29/03	RSML05	ND	ND	ND	ND	ND	ND	ND
06/30/03	RSML01	ND	ND	ND	ND	ND	ND	ND
07/01/03	RSML05	ND	ND	ND	ND	ND	ND	ND
07/02/03	RSML05	ND	ND	ND	ND	ND	ND	ND
07/03/03	RSML05	ND	ND	ND	ND	ND	ND	ND
07/04/03	RSML06	ND	ND	ND	ND	ND	ND	ND
07/05/03	RSML01	ND	ND	ND	ND	ND	ND	ND
07/06/03	RSML06	ND	ND	ND	ND	ND	ND	ND
07/07/03	RSML01	ND	ND	ND	ND	ND	ND	ND
07/09/03	RSML04	0.71	ND	ND	ND	ND	ND	ND
07/10/03	RSML04	ND	ND	ND	ND	ND	ND	ND
07/11/03	RSML01	ND	ND	ND	ND	ND	ND	ND
07/12/03	RSML03	ND	ND	ND	ND	ND	ND	ND
07/13/03	RSML03	ND	ND	ND	ND	ND	ND	ND
07/14/03	RSML01	ND	ND	ND	ND	ND	ND	ND
07/15/03	RSML05	ND	ND	ND	ND	ND	ND	ND
07/16/03	RSML02	ND	ND	ND	ND	ND	ND	ND
07/17/03	RSML02	ND	ND	ND	ND	ND	ND	ND
07/18/03	RSML06	ND	ND	ND	ND	ND	ND	ND
07/19/03	RSML03	ND	ND	ND	ND	ND	ND	ND
07/20/03	RSML05	ND	ND	ND	ND	ND	ND	ND
07/21/03	RSML01	ND	ND	ND	ND	ND	ND	ND
07/22/03	RSML01	ND	ND	ND	ND	ND	ND	ND
07/23/03	RSML03	ND	ND	ND	ND	ND	ND	ND

**NOTES:**

TCE = Trichloroethene

1,1-DCE = 1,1-Dichloroethene

1,2-DCE = 1,2-Dichloroethene

VC = Vinyl Chloride

1,1,1-TCA = 1,1,1-Trichloroethane

1,1-DCA = 1,1-Dichloroethane

PCE = Tetrachloroethene

ppb = parts per billion

ND = Non Detect

Detection Limit <1 ppb for each compound.

**TABLE 3**  
**Summary of Ambient Air Analytical Results**  
**Property Perimeter**

The Lockformer Company / Lisle, Illinois

SAMPLE DATE	SAMPLE LOCATION	COMPOUNDS						
		TCE	1,1-DCE	1,2-DCE (cis + trans)	VC	1,1,1-TCA	1,1-DCA	PCE
		Corresponding Maximum 8-Hour Exposure Standard						
		875 ppb	175 ppb	1,750 ppb	263 ppb	6,125 ppb	N/A	350 ppb
06/26/03	PML01	ND	ND	ND	ND	ND	ND	ND
06/27/03	PML01	ND	ND	ND	ND	ND	ND	ND
07/01/03	PML04	ND	ND	ND	ND	ND	ND	ND
07/03/03	PML04	0.98	ND	ND	ND	ND	ND	ND
07/05/03	PML04	0.6	ND	ND	ND	ND	ND	ND
07/10/03	PML01	ND	ND	ND	ND	ND	ND	ND
07/15/03	PML01	ND	ND	ND	ND	ND	ND	ND
07/18/03	PML02	ND	ND	ND	ND	ND	ND	ND
07/22/03	PML02	ND	ND	ND	ND	ND	ND	ND

**NOTES:**

TCE = Trichloroethene

1,1-DCE = 1,1-Dichloroethene

1,2-DCE = 1,2-Dichloroethene

VC = Vinyl Chloride

1,1,1-TCA = 1,1,1-Trichloroethane

1,1-DCA = 1,1-Dichloroethane

PCE = Tetrachloroethene

ppb = parts per billion

ND = Non Detect

Detection Limit <1ppb for each compound

**TABLE 4**  
**Summary of Analytical Results**  
**Remediation Area Perimeter**

The Lockformer Company / Lisle, Illinois

SAMPLE DATE	START TIME	RAP 1	RAP 2	RAP 3	RAP 4
06/26/03	9:26	<1	<1	<1	<1
	14:42	<1	<1	<1	<1
06/27/03	11:20	<1	<1	<1	<1
	12:46	<1	<1	<1	<1
	16:39	<1	<1	<1	<1
06/28/03	8:11	<1	<1	<1	<1
	12:52	<1	<1	<1	<1
	17:25	<1	<1	<1	<1
06/29/03	9:44	<1	<1	<1	<1
	13:40	<1	<1	<1	<1
	17:56	<1	<1	<1	<1
06/30/03	9:01	<1	<1	<1	<1
	13:50	<1	<1	<1	<1
	17:10	<1	<1	<1	<1
07/01/03	8:30	<1	<1	<1	<1
	12:50	<1	<1	<1	<1
	16:33	<1	<1	<1	<1
07/02/03	8:55	<1	<1	<1	<1
	12:31	<1	<1	<1	<1
	17:05	<1	<1	<1	<1
07/03/03	8:30	<1	<1	<1	<1
	12:35	<1	<1	<1	<1
	16:25	<1	<1	<1	<1
07/04/03	8:05	<1	<1	<1	<1
07/05/03	9:52	<1	<1	<1	<1
	17:55	<1	<1	<1	<1
07/06/03	10:00	<1	<1	<1	<1
	17:30	<1	<1	<1	<1
07/07/03	8:25	<1	<1	<1	<1
	12:01	<1	<1	<1	<1
	14:20	<1	<1	<1	<1
07/08/03	8:55	<1	<1	<1	<1
	12:06	<1	<1	<1	<1
	17:03	<1	<1	<1	<1
07/09/03	8:48	<1	<1	<1	<1
	16:00	<1	<1	<1	<1
07/10/03	8:20	<1	<1	<1	<1
	11:27	<1	<1	<1	<1
	16:45	<1	<1	<1	<1
07/11/03	8:38	<1	<1	<1	<1
	12:35	<1	<1	<1	<1
	16:40	<1	<1	<1	<1
07/12/03	10:04	<1	<1	<1	<1
07/13/03	11:02	<1	<1	<1	<1
07/14/03	9:21	<1	<1	<1	<1
	13:30	<1	<1	<1	<1
	16:52	<1	<1	<1	<1
07/15/03	9:42	<1	<1	<1	<1
	12:50	<1	<1	<1	<1
	17:21	<1	<1	<1	<1
07/16/03	9:05	<1	<1	<1	<1
	13:41	<1	<1	<1	<1
	17:00	<1	<1	<1	<1

**TABLE 4**  
**Summary of Analytical Results**  
**Remediation Area Perimeter**

The Lockformer Company / Lisle, Illinois

SAMPLE DATE	START TIME	RAP 1	RAP 2	RAP 3	RAP 4
07/17/03	8:40	<1	<1	<1	<1
	12:52	<1	<1	<1	<1
	16:20	<1	<1	<1	<1
07/18/03	8:18	<1	<1	<1	<1
	13:45	<1	<1	<1	<1
	17:02	<1	<1	<1	<1
07/19/03	9:30	<1	<1	<1	<1
07/20/03	10:50	<1	<1	<1	<1
07/21/03	9:15	<1	<1	<1	<1
	13:35	<1	<1	<1	<1
	17:35	<1	<1	<1	<1
07/22/03	9:05	<1	<1	<1	<1
	13:57	<1	<1	<1	<1
	16:40	<1	<1	<1	<1
07/23/03	8:45	<1	<1	<1	<1
	13:24	<1	<1	<1	<1
	17:09	<1	<1	<1	<1
07/24/03	9:18	<1	<1	<1	<1
	13:31	<1	<1	<1	<1
	16:30	<1	<1	<1	<1
07/25/03	9:59	<1	<1	<1	<1
	13:35	<1	<1	<1	<1
	17:30	<1	<1	<1	<1
07/26/03	10:30	<1	<1	<1	<1
07/27/03	10:34	<1	<1	<1	<1
07/28/03	14:30	<1	<1	<1	<1
	16:41	<1	<1	<1	<1
07/29/03	9:10	<1	<1	<1	<1
	11:55	<1	<1	<1	<1
	14:25	<1	<1	<1	<1
07/30/03	9:05	<1	<1	<1	<1
	13:02	<1	<1	<1	<1
	16:42	<1	<1	<1	<1
07/31/03	8:35	<1	<1	<1	<1
	11:00	<1	<1	<1	<1
	16:27	<1	<1	<1	<1
08/01/03	8:50	<1	<1	<1	<1

**NOTES:** PID values in PPM.

**TABLE 5**  
**Summary of Analytical Results**  
*Performance of Vapor Phase Granulated Activated Carbon Units*

The Lockformer Company / Lisle, Illinois

SAMPLE DATE	Trichloroethene (TCE)			cis-1,2-Dichloroethene			Percent Reduction				Total Percent Reduction	
	Inlet To First Carbon Unit (PPM)	Between Carbon Units (PPM)	Outlet from second carbon unit (PPM)	Inlet To First Carbon Unit (PPM)	Between Carbon Units (PPM)	Outlet From Second Carbon Unit (PPM)	TCE After First Carbon Unit (%)	TCE After Both Carbon Units (%)	CIS After First Carbon Unit (%)	CIS After Both Carbon Units (%)	After First Carbon Unit (%)	After Both Carbon Units (%)
06/10/03	11.0	0.0035	0.0016	2.6	0.00053	< 0.00033	99.97%	99.99%	99.98%	> 99.99%	99.97%	99.99%
06/12/03	9.5	< 0.00023	< 0.00032	2.0	< 0.00031	< 0.00023	> 99.99%	> 99.99%	> 99.98%	> 99.99%	> 99.99%	> 99.99%
06/17/03	9.2	0.00064	0.0011	2.1	< 0.00033	< 0.00032	99.99%	99.99%	> 99.98%	> 99.98%	99.99%	99.99%
06/24/03	5.9	0.0003	< 0.00025	1.1	0.0035	< 0.00033	99.99%	> 99.99%	99.68%	> 99.97%	99.95%	> 99.99%
06/26/03	3.4	0.00082	< 0.00024	0.65	0.0049	< 0.00032	99.98%	> 99.99%	99.25%	> 99.95%	99.86%	> 99.99%
06/28/03	3.1	0.0017	0.00036	0.57	0.0086	< 0.00032	99.95%	99.99%	98.49%	> 99.94%	99.72%	99.98%
07/01/03	2.9	0.0021	0.00032	0.47	0.011	< 0.00032	99.93%	99.99%	97.66%	> 99.93%	99.61%	99.98%
07/03/03	2.9	0.004	0.001	0.45	0.02	0.00033	99.86%	99.97%	95.56%	99.93%	99.28%	99.96%
07/08/03	1.6	0.0056	< 0.00023	0.32	0.00099	< 0.00032	99.65%	> 99.99%	99.69%	> 99.90%	99.66%	> 99.97%
07/11/03	1.4	0.0065	< 0.00023	0.21	0.044	< 0.00032	99.54%	> 99.98%	79.05%	> 99.85%	96.86%	> 99.97%
07/14/03	1.8	0.01	< 0.00023	0.29	0.053	< 0.00032	99.44%	> 99.99%	81.72%	> 99.89%	96.99%	> 99.97%
07/17/03	1.3	0.018	< 0.00023	0.19	0.07	< 0.00032	98.62%	> 99.98%	63.16%	> 99.83%	94.09%	> 99.96%
07/22/03	1.5	0.021	< 0.00023	0.30	0.092	< 0.00032	98.60%	99.98%	69.33%	99.89%	93.72%	> 99.97%

**NOTES:**

Blank cells = Samples submitted. Results not yet received.

**TABLE 6**  
**Weekly Project Cost Estimate**  
**Air Monitoring/Sampling Program**

The Lockformer Company / Lisle, Illinois

**Scope of Work:**

Includes the following weekly air sampling/monitoring activities:

- (a) Vapor Phase Granular Activated Carbon
- (b) ERH Remediation Area Perimeter
- (c) Site Perimeter
- (d) Residential Area
- (e) Lockformer Building
- (f) Vapor Piezometers
- (g) Vapor Extraction Wells

**Professional Fees**

Project Management	3 hrs	\$ 130 \hr	\$ 390
Project Coordination	3 hrs	\$ 85 \hr	\$ 255
Data Evaluation/Coordination	10 hrs	\$ 140 \hr	\$ 1,400
Deliverable Preparation	10 hrs	\$ 50 \hr	\$ 500

**Field Activity**

Sample Collection/Monitoring/Documentation	50 hrs	\$ 60 \hr	\$ 3,000
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(8 hrs/day Monday through Friday and 5 hours/weekend)

**TOTAL PROFESSIONAL FEES** \$ 5,545

**Field Equipment**

Field Truck	7 days	\$ 40 \day	\$ 280
<b>TOTAL FIELD EQUIPMENT</b>			\$ 280

**Subcontracting**

Summa Canister Air Analysis	15 samples	\$ 370 \sample	\$ 5,550
			\$ 5,550
Water Analysis (Liquid Treatment System)	3 samples	\$ 142 \sample	\$ 426
			\$ 426

**TOTAL SUBCONTRACTING** \$ 5,976

**Weekly Air Monitoring/Sampling Program Total** \$ 11,801

**TABLE 7**  
**Summary of Proposed Routine Air Program Revisions**

**The Lockformer Company/Lisle, IL**

<b>Sample Location</b>	<b>Existing Monitoring Schedule</b>	<b>Proposed Monitoring Schedule</b>
<b>Air Treatment System</b>		
Influent (VPGAC01)	2 summas/week @ temp. <50 deg. C none @ temp. > 50 deg. C	1 Tedlar Bag per week
Intermediate (VPGAC02)	2 summas/week @ temp. <50 deg. C none @ temp. > 50 deg. C	1 Tedlar Bag per week
Effluent/Stack (VPGAC03)	2 summas/week @ <50 deg. C @ temp >50, 30 daily summas then 1/week	3 Tedlar Bag & 1 Summa canister per week
Carbon Replacement	When intermediate VOC conc. > 20% of inlet conc.	When intermediate VOC conc. > 40% of influent w/ not to exceed of 20 ppm
<b>Liquid Treatment System</b>		
Influent (LPGAC01)	1 VOC/month	Unchanged
Intermediate (LPGAC02)	1 VOC/month	Unchanged
Effluent/Stack (LPGAC03)	1 VOC/month	Unchanged
<b>Ambient Air Monitoring</b>		
Residential	1 summa/day for 60 days then 1/week	unchanged
Site Perimeter	2 summas/week @ temp. <50 deg. C >50 deg. C, daily summas for 30 days then 1/week	2 summa cannisters per week
ERH Remediation Area Perimeter	temp. <50 deg. C, PID monitoring 3 times/weekday and 1/weekend day Results >25 ppm tested for TCE with Miran. temp. >50 deg. C, incorporate Miran 1/weekday	monitoring 3 times/weekday with PID Results >25 ppm tested for TCE with Miran.
Building Interior	1/week with PID	1/week with PID Results >25 ppm tested for TCE with Miran
<b>Remediation System Monitoring</b>		
SVE Wells	PID/Tedlar bag 1/week	Unchanged
Vacuum Piezometers	<50 deg. C, weekly monitoring for pressure and VOC (PID) Between 50 and 90 deg. C, daily monitoring for pressure and VOC (PID)	Unchanged

## **ATTACHMENT A**



# ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

P.O. Box 19506, SPRINGFIELD, ILLINOIS 62794-9506

RENEE CIPRIANO, DIRECTOR

217/782-2113

## CONSTRUCTION PERMIT

### PERMITTEE

The Lockformer Company  
Attn: Rian Scheel  
711 West Ogden Avenue  
Lisle, Illinois 60532

Application No.: 02120050

I.D. No.: 043055AAC

Applicant's Designation: ERH-SVE

Date Received: December 18, 2002

Subject: Soil Vapor Extractor controlled by carbon adsorption system

Date Issued: March 18, 2003

Expiration Date: See Condition 1.

This permit is hereby granted to the above-designated Permittee to CONSTRUCT emission unit(s) and/or air pollution control equipment consisting of:

- 1 Soil Vapor Extraction System with Electric Resistive Heating Controlled by a Carbon Adsorption System

pursuant to the above-referenced application. This permit is subject to standard conditions attached hereto and the following special condition(s):

- 1a. Prior to operating the soil vapor extraction system, the Permittee shall install a carbon adsorption system with a saturation indicator and recorder.
- b. The Permittee shall change the carbon filters prior to when the saturation indicator has indicated that the carbon bed is fully saturated.
- c. The Permittee shall keep records of the maintenance and operation of the carbon adsorption system including the replacement of the carbon filters. These records shall be retained for three years and shall be available for inspection by the Illinois EPA.
2. Pursuant to 35 Ill. Adm. Code Section 218.301, no person shall cause or allow the discharge of more than 3.6 kg/hour (8 lbs/hour) of organic material into the atmosphere from any emission unit, except as provided in Sections 218.302, 218.303, 218.304 and the following exception: If no odor nuisance exists the limitation of Subpart G shall apply only to photochemically reactive material.
3. In the event that the operation of this facility results in an odor nuisance or any other nuisance due to the operations described in the permit application, the Permittee shall take all appropriate and necessary actions, including but not limited to, changes in operating conditions or installation of controls, in order to eliminate the nuisance.

ROD R. BLAGOJEVICH

GOVERNOR

4. Emissions of volatile organic material (VOM) or Hazardous Air Pollutants (HAP) from the equipment shall not exceed the following limits:

<u>Item of Equipment</u>	<u>Flow Rate (scfm)</u>	<u>VOM/HAP Emissions (Ton/Month)</u>	<u>(Tons/Year)</u>
Soil Vapor Extractor	2,400	0.66	6.57

These limits are based on maximum values for vacuum rate of 2,400 cfm, a soil gas concentration of 120 ppmv, continuous operations (8,760 hours per year), and a control efficiency of 75% from the carbon adsorption system, and information provided in the permit application. Compliance with annual limits shall be determined from a running total of 12 months of data.

5. The emissions of Hazardous Air Pollutants (HAPs) as listed in Section 112(b) of the Clean Air Act shall not equal or exceed 10 tons per year of any single HAP or 25 tons per year of any combination of such HAPs, or such lesser quantity as USEPA may establish in rule which would require the Permittee to obtain a CAAPP permit from the Illinois EPA. As a result of this condition, this permit is issued based on the emissions of any HAP from this source not triggering the requirement to obtain a CAAPP permit from the Illinois EPA.
6. The soil vapor extraction system with electric resistive heating controlled by a carbon adsorption system may be operated under this construction permit until and application for Title V or a Federally Enforceable State Operating Permit (FESOP) has been issued incorporating these conditions, provided a timely application is submitted for a Title V permit or FESOP to incorporate these conditions.
7. The soil vapor extraction system with electric resistive heating controlled by a carbon adsorption system shall not begin operation until construction including construction of any air pollution control equipment is complete, and reasonable measures short of actual operation have been taken to verify proper operation.
8. Within 60 days of initial startup, the volatile organic material emissions of the soil vapor extraction system with electric resistive heating controlled by a carbon adsorption system shall be measured during conditions which are representative of maximum emissions.
9. The following methods and procedures shall be used for testing of emissions unless another method is approved by the Illinois EPA: Refer to 40 CFR 60, Appendix A, and 40 CFR 61, Appendix B, for USEPA test methods.

Location of Sample Points	USEPA Method 1
Gas Flow and Velocity	USEPA Method 2
Flue Gas Weight	USEPA Method 3

Page

Moisture	USEPA Method 4
Volatile Organic Material	USEPA Method 25, or
Method 25A if outlet VOM < 50 ppmv as non-methane carbon	

10. Copies of the Final Report(s) for these tests shall be submitted to the Illinois EPA with 14 days after test results are compiled and finalized.
11. 60 days after completion of sampling, the Final Report shall include as minimum:
  - a. A summary of results
  - b. General information
  - c. Description of test method(s), including description of sampling points, sampling train, analysis equipment, and test schedule
  - d. Detailed description of test conditions, including
    - i. Process information, i.e., mode(s) of operating process rate, e.g. fuel or raw material consumption
    - Control equipment information, i.e., equipment condition and operating parameters during testing, and
    - A discussion of any preparatory actions taken, i.e., inspections, maintenance and repair
  - e. Data and calculations, including copies of all raw data sheets and records of laboratory analyses, sample calculations, and data on equipment calibration
  - f. An explanation of any discrepancies among individual tests or anomalous data
  - g. The results of all quality control evaluation, including a copy of all quality control data.
12. Two (2) copies of required reports and notifications concerning equipment operation or repairs, performance testing or a continuous monitoring system shall be sent to:

Illinois Environmental Protection Agency  
Division of Air Pollution Control  
Compliance Section (#40)  
P.O. Box 19276  
Springfield, Illinois 62794-9276

and one (1) copy shall be sent to the Illinois EPA's regional office at the following address unless otherwise indicated:

Illinois Environmental Protection Agency  
Division of Air Pollution Control  
9511 West Harrison  
Des Plaines, Illinois 61614

13. The Permittee shall maintain monthly records of the following items:
  - a. Remediation system operating hours (hours/month and hours/year);
  - b. Monitored soil gas/groundwater VOM and HAP concentrations (ppmv and  $\mu\text{g/L}$ , respectively);
  - c. VOM and HAP emissions (lb/month and tons/year)
14. All records and logs required by this permit shall be retained at a readily accessible location at the source for at least three years from the date of entry and shall be made available for inspection and copying by the Illinois EPA upon request. Any records retained in an electronic format (e.g., computer) shall be capable of being retrieved and printed on paper during normal source office hours so as to be able to respond to an Illinois EPA request for records during the course of a source inspection.
15. If there is an exceedance of the requirements of this permit as determined by the records required by this permit, the Permittee shall submit a report to the Illinois EPA's Compliance Section in Springfield, Illinois within 30 days after the exceedance. The report shall include the emissions released in accordance with the recordkeeping requirements, a copy of the relevant records, and a description of the exceedance or violation and efforts to reduce emissions and future occurrences.

It should be noted that the issuance of this permit does not relieve the Permittee of the responsibility of complying with the provisions of the State of Illinois Rules and Regulations, Title 35: Subtitle C, Water Pollution Control, Chapter 1. The Permittee may need to obtain a permit from the Division of Water Pollution Control for operation of the wastewater pretreatment system and discharge tributary.

It should be noted that issuance of this permit does not relieve the Permittee from compliance with the 35 Ill. Adm. Code Part 731 Underground Storage Tanks or the permit requirements of Section 21 and 39 of the Environmental Protection Act with respect to a waste management operation, nor does it constitute a release from further responsibility for preventive or corrective action as defined under Section 4(y) of the Environmental Protection Act. Pursuant to 35 Ill. Adm. Code Part 731, approval may be required from the Bureau of Land - Leaking Underground Storage Tank Section (217/782-6761) prior to the installation of this equipment.

Page 5

It should be noted that issuance of this permit does not relieve the Permittee from compliance with the permit requirements of Section 21 and 39 of the Environmental Protection Act with respect to a waste management operation, nor does it constitute a release from further responsibility for preventive or correction action as defined under Section 4(y) of the Environmental Protection Act. The Bureau of Land, Division of Remediation Management (217/782-6760) should be contacted prior to the installation of this equipment.

If you have any questions on this permit, please contact John Blazis at 217/782-2113.

A handwritten signature in dark ink, appearing to read "Donald E. Sutton". The signature is stylized with a large initial "D" and a cursive "Sutton".

Donald E. Sutton, P.E.  
Manager, Permit Section  
Division of Air Pollution Control

DES:JPB:psj

cc: Region 1



STATE OF ILLINOIS  
ENVIRONMENTAL PROTECTION AGENCY  
DIVISION OF AIR POLLUTION CONTROL  
P. O. BOX 19506  
SPRINGFIELD, ILLINOIS 62794-9506

**STANDARD CONDITIONS FOR CONSTRUCTION/DEVELOPMENT PERMITS  
ISSUED BY THE ILLINOIS ENVIRONMENTAL PROTECTION AGENCY**

July 1, 1985

The Illinois Environmental Protection Act (Illinois Revised Statutes, Chapter 111-1/2, Section 1039) authorizes the Environmental Protection Agency to impose conditions on permits which it issues.

The following conditions are applicable unless superseded by special condition(s).

1. Unless this permit has been extended or it has been voided by a newly issued permit, this permit will expire one year from the date of issuance, unless a continuous program of construction or development on this project has started by such time.
2. The construction or development covered by this permit shall be done in compliance with applicable provisions of the Illinois Environmental Protection Act and Regulations adopted by the Illinois Pollution Control Board.
3. There shall be no deviations from the approved plans and specifications unless a written request for modification, along with plans and specifications as required, shall have been submitted to the Agency and a supplemental written permit issued.
4. The permittee shall allow any duly authorized agent of the Agency upon the presentation of credentials, at reasonable times:
  - a. to enter the permittee's property where actual or potential effluent, emission or noise sources are located or where any activity is to be conducted pursuant to this permit,
  - b. to have access to and to copy any records required to be kept under the terms and conditions of this permit.
  - c. to inspect, including during any hours of operation of equipment constructed or operated under this permit such equipment and any equipment required to be kept, used, operated, calibrated and maintained under this permit,
  - d. to obtain and remove samples of any discharge or emissions of pollutants, and
  - e. to enter and utilize any photographic, recording, testing, monitoring or other equipment for the purpose of preserving, testing, monitoring, or recording any activity, discharge, or emission authorized by this permit
5. The issuance of this permit:
  - a. shall not be considered as in any manner affecting the title of the premises upon which the permitter facilities are to be located,
  - b. does not release the permittee from any liability for damage to person or property caused by or resulting from the construction, maintenance, or operation of the proposed facilities,
  - c. does not release the permittee from compliance with other applicable statutes and regulations of the United States, of the State of Illinois, or with applicable local laws, ordinances and regulations,
  - d. does not take into consideration or attest to the structural stability of any units or parts of the project, and



STATE OF ILLINOIS  
ENVIRONMENTAL PROTECTION AGENCY  
DIVISION OF AIR POLLUTION CONTROL  
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4. The permittee shall allow any duly authorized agent of the Agency upon the presentation of credentials, at reasonable times:
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  - b. to have access to and to copy any records required to be kept under the terms and conditions of this permit,
  - c. to inspect, including during any hours of operation of equipment constructed or operated under this permit, such equipment and any equipment required to be kept, used, operated, calibrated and maintained under this permit,
  - d. to obtain and remove samples of any discharge or emissions of pollutants, and
  - e. to enter and utilize any photographic, recording, testing, monitoring or other equipment for the purpose of preserving, testing, monitoring, or recording any activity, discharge, or emission authorized by this permit.
5. The issuance of this permit:
  - a. shall not be considered as in any manner affecting the title of the premises upon which the permitted facilities are to be located,
  - b. does not release the permittee from any liability for damage to person or property caused by or resulting from the construction, maintenance, or operation of the proposed facilities,
  - c. does not release the permittee from compliance with other applicable statutes and regulations of the United States, of the State of Illinois, or with applicable local laws, ordinances and regulations,
  - d. does not take into consideration or attest to the structural stability of any units or parts of the project, and

IL 532-0226

APC 166 Rev. 5/99

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September 1, 1992

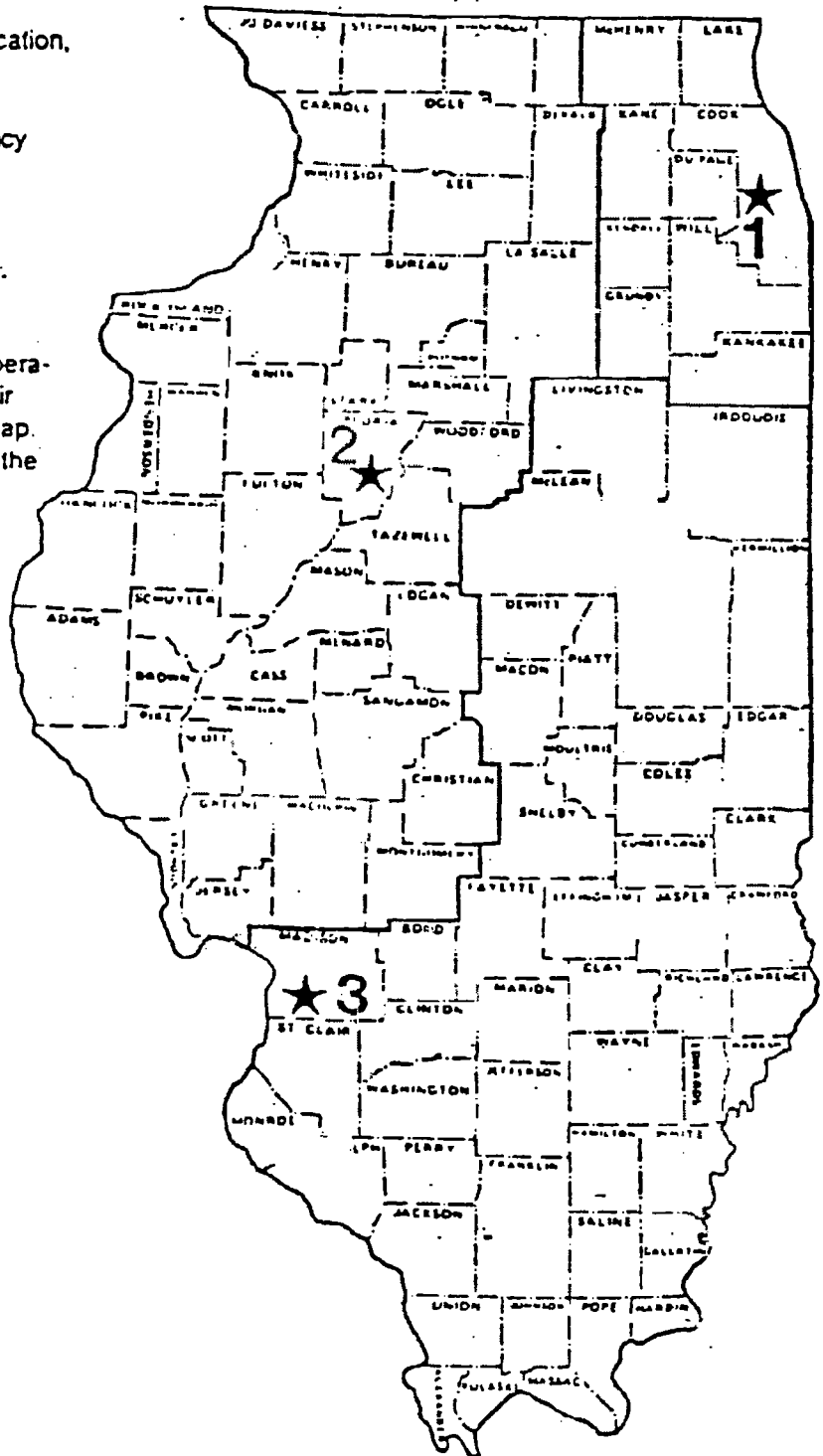
For assistance in preparing a permit application,  
contact the Permit Section:

Illinois Environmental Protection Agency  
Division of Air Pollution Control  
Permit Section  
2200 Churchill Road  
Springfield, Illinois 62706  
217/782-2113

Or contact a regional office of the Field Operations Section. The regional offices and their areas of responsibility are shown on the map. The addresses and telephone numbers of the regional offices are as follows:

ILLINOIS EPA  
REGION 1  
BUREAU OF AIR, FOS  
9511 WEST HARRISON  
DES PLAINES, IL 60016  
847-294-4000

Illinois EPA  
Region 2  
5115 North University  
Peoria, Illinois 61614  
309/693-5461



## **ATTACHMENT B**

**Calculation of Allowable Emissions  
From the Remediation System Stack**

**The Lockformer Company  
Lisle, Illinois**

Clayton Project No. 65263  
July 10, 2003

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*Prepared for:*  
**THE LOCKFORMER COMPANY  
Lisle, Illinois**

*Prepared by:*  
**CLAYTON GROUP SERVICES, INC.  
3140 Finley Road  
Downers Grove, Illinois 60515  
630.795.3200**

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## 1.0 INTRODUCTION

The Lockformer Company (Lockformer) will be performing soil remediation activities at its facility in Lisle, Illinois. The remediation systems include Soil Vapor Extraction (SVE) and Electrical Resistive Heating (ERH). Emissions from the remediation systems will be sent to activated carbon units before being released into the atmosphere.

USEPA has provided Lockformer with the maximum annual ambient air concentrations for six chemicals that have the potential to be emitted from the Lockformer stack. These maximum annual ambient air concentrations are presented below:

Chemical	Maximum Annual Exposure (ppb)
TCE	100
1,1-DCE	20
1,2-DCE (cis + trans)	200
Vinyl chloride	30
1,1,1-TCA	700
1,1-DCA	N/A
PCE	40

USEPA has requested that Lockformer calculate the emission rates from the stack that would result in annual ambient air concentrations no higher than shown above. USEPA requested that Lockformer use the EPA Screen3 model to perform the calculations since *this model gives more conservative estimates than other EPA-approved models.*

The Screen3 model calculates maximum one-hour concentrations downwind of the stack. The model does not calculate maximum annual concentrations. However, the EPA has provided procedures for estimating maximum annual concentrations based on estimated maximum one-hour concentrations (Document #EPA-454/R-92-019). The conversion factor presented in this document is 0.08 ( $\pm$  0.02). The document states, "A degree of conservatism is incorporated in the factors to provide reasonable assurance that the

maximum concentrations for 3-, 8-, 24-hour, and annual values will not be underestimated.” Therefore, based on the information contained in EPA-454/R-92-019, the corresponding maximum allowable one-hour concentrations for the above chemicals, using the value of 0.08, are:

Chemical	Maximum One-Hour Exposure (ppb)
TCE	1,250
1,1-DCE	250
1,2-DCE (cis + trans)	2,500
Vinyl chloride	375
1,1,1-TCA	8,750
PCE	500

The Screen3 model provides maximum one-hour concentrations in  $\mu\text{g}/\text{m}^3$ . In order to convert the ppb values provided above to  $\mu\text{g}/\text{m}^3$ , the following equation must be used:

$$\frac{\mu\text{g}}{\text{m}^3} = \frac{\text{ppb} \times \text{MW}}{24.46}$$

where MW = molecular weight of the chemical

Calculation of the maximum allowable one-hour concentration, in  $\mu\text{g}/\text{m}^3$ , is provided below:

Chemical	Maximum One-Hour Exposure (ppb)	MW	Maximum One-Hour Exposure ( $\mu\text{g}/\text{m}^3$ )
TCE	1,250	131.39	6,715
1,1-DCE	250	96.94	991
1,2-DCE (cis + trans)	2,500	96.94	9,908
Vinyl chloride	375	62.50	958
1,1,1-TCA	8,750	133.41	47,724
PCE	500	165.83	3,390

## 2.0 BASIS OF CALCULATIONS

The design basis of the effluent from the remediation system is as follows:

Stack Height	30 feet
Stack Diameter	8 inches
Flow Rate	4,000 acfm
Exit Gas Temperature	90° F

In addition, the Screen3 model requires the user to make a number of other choices, which are described below:

- The user must choose among a point, flare, area, or volume source. All runs were made based on a point source.
- Because the remediation system stack is only 7 feet above the building, the downwash option was run. The minimum horizontal length of the building (305 feet) and the maximum horizontal length of the boring (360 feet) were used. The building height of 23 feet was used.
- The ambient air default temperature of 67.73° F was used.
- Runs were made using rural dispersion coefficients, since the population within 1.5 kilometers of the remediation stack is approximately 6,000 people, and the use of rural coefficients is recommended when the population is less than 21,200 people.
- The regulatory default mixing height option was used.
- The minimum distance to the property line (212 feet) was used for all runs.

### 3.0 RESULTS

Runs were made for full meteorology to determine the maximum one-hour concentration and distance for any stability class. The runs assumed an emission rate of 8 lbs/hr. The maximum calculated ambient one-hour concentration, based on an emission rate of 8 lbs/hr, is presented below:

Input Parameters	Output		
	Maximum Concentration ( $\mu\text{g}/\text{m}^3$ )	Distance (meters)	Stability Class
Downwash, Rural Coefficients	318	66	D

The results of the modeling lead to the conclusion that an emission rate of 8 lbs/hr would not exceed any of the allowable one-hour ambient air concentrations. The lowest one-hour allowable concentration is for vinyl chloride. Even if all the emissions were vinyl chloride, the estimated maximum concentration of  $318 \mu\text{g}/\text{m}^3$  is significantly less than the allowable concentration of  $958 \mu\text{g}/\text{m}^3$ . In reality, any emissions will be composed almost entirely of TCE. A TCE concentration of  $318 \mu\text{g}/\text{m}^3$  is less than 5% of the allowable concentration of  $6,715 \mu\text{g}/\text{m}^3$ .

#### **4.0     CONCLUSION**

Using the modeling program recommended by the USEPA, Lockformer should be able to emit significantly more than 8 pounds per hour from its remediation stack and still be in compliance with the allowable annual ambient air concentrations provided by the USEPA

It is likely, therefore, that the air permit will be the controlling factor that limits the emissions from the stack.